What is claimed is:

1. A method of heating a fuel cell from an initial temperature to a desired temperature higher than the initial temperature, wherein the fuel cell comprises an anode comprising an anode flow field plate, an anode diffusion layer and an anode catalyst layer, a cathode comprising a cathode flow field plate, a cathode diffusion layer and a cathode catalyst layer, and a proton conductive membrane, the method comprising the steps of:

   (a) operating the fuel cell at an open circuit state;

   (b) feeding at a fuel feed rate an aqueous fuel solution to the anode and feeding at an oxidant feed rate an oxidant to the cathode;

   (c) allowing fuel in the fuel solution to diffuse through the proton conductive membrane from the anode to the cathode; and

   (d) oxidizing the fuel at the cathode to generate heat, thereby heating the fuel cell.

2. The method of claim 1 wherein the fuel is methanol.

3. The method of claim 2 wherein the fuel solution has a concentration of methanol that is the same as or greater than a second concentration of methanol when the fuel cell is operated under normal conditions.

4. The method of claim 3 wherein the concentration of methanol is in the range of from 0.5 to 25 wt.%.

5. The method of claim 3, wherein the concentration of methanol is at least 40 wt% when the initial temperature is less than –40°C.

6. The method of claim 1 further comprising the step of varying the oxidant feed rate so as to control the heating of the fuel cell.

7. The method of claim 1 further comprising the step of varying the fuel feed rate so as to control the heating of the fuel cell.

8. The method of claim 1 wherein the fuel solution is fed from a fuel reservoir

and the method further comprising the step of recycling the aqueous fuel solution back to the fuel reservoir.

9. The method of claim 1 further comprising the step of controlling temperature of the fuel solution fed to the anode.

10. The method of claim 1 further comprising the step of connecting an external circuit to the fuel cell thereby ceasing to operate the fuel cell in the open circuit state.

11. The method of claim 1 comprising a plurality of fuel cells arranged in a fuel cell stack.

12. The method of claim 11 wherein the fuel is methanol.

13. The method of claim 12 wherein the fuel solution has a concentration of methanol that is the same as or greater than a second concentration of methanol when the fuel cell is operated under normal conditions.

14. The method of claim 13 wherein the concentration of methanol is in the range of from 0.5 to 25 wt.%.

15. The method of claim 13 wherein the concentration of methanol is at least 40 wt% when the initial temperature is less than $-40^{\circ}C$.

16. The method of claim 11 further comprising the step of varying the oxidant feed rate so as to control the heating of the fuel cell

17. The method of claim 11 further comprising the step of varying the fuel feed rate so as to control the heating of the fuel cell.

18. The method of claim 11 wherein the fuel solution is fed from a fuel reservoir and the method further comprising the step of recycling the aqueous fuel solution back to the fuel reservoir.

19. The method of claim 11 further comprising the step of controlling temperature of the fuel solution fed to the anode.

20. The method of claim 11 further comprising the step of connecting an external

circuit to the fuel cell thereby ceasing to operate the fuel cell in the open circuit state.